

What is claimed is:

1. An apparatus for multi-party communication in a communication system comprising:

5 a multi-party communication device configured to accept a plurality of types of communication signals from multiple parties via a transport network, the multi-party communication bridge including:

one or more tagging devices that are each configured to respectively tag incoming communication signals with predetermined information particular to each signal; and

10 a controller configured to combine the tagged output signals from the one or more tagging devices into data packet signals and transmit the data packet signals to each of the multiple parties via the transport network.

15 2. The apparatus according to claim 1, wherein a first type of signals of the plurality of types of signals is packet based signals and a second type of signals of the plurality of types of signals is pulse code modulated signals.

20 3. The apparatus according to claim 2, wherein the packet based signals are received from at least one of wireless mobile stations and voice over IP users and the pulse code modulated signals are received from PSTN landline users.

4. The apparatus according to claim 2, further comprising:

one or more expanders each configured to decode received pulse code modulated signals;

a summing device configured to receive and sum the decoded signals output from the one or more expanders; and

an encoder configured to receive the summed signal from the summing device, encode the signal for packet based transmission and tag the encoded packet based signal with predetermined information particular to the encoded packet based signal;

5. The apparatus according to claim 1, further comprising:

one or more decoding devices each associated with a corresponding one of the multiple parties, the one or more decoding devices each configured to receive the signals transmitted by the multi-party communication device via the transport network and including:

a plurality of decoders configured to decode signals; and

a de-tagging and scheduling device that is configured to receive the packet based signals, read the predetermined information contained in the tags and schedule a queue that determines a sequential order according to which packets are sent to the decoders and also addresses which of the plurality of decoders that a particular signal is to be sent.

6. The apparatus according to claim 5, wherein each of the plurality of decoders is configured to decode a corresponding type of signal according to a predetermined decoding algorithm and also configured to decode multiple signals that are of the same type, but having differing parameters.

7. The apparatus according to claim 6, wherein each of the plurality of decoders includes a plurality of predetermined thread logic routines that each correspond to a signal of the multiple signals that are of the same type, but have different parameters.

8. The apparatus according to claim 5, wherein each of the one or more decoding devices is assigned to one of a corresponding end user and a PSTN using the multi-party communication device.

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9. The apparatus according to claim 5, wherein the tagging and scheduling device schedules the queue for decoding incoming signals based on a task scheduling algorithm wherein the signals to be decoded are ordered according to a speech rate of the packet.

10 10. The apparatus according to claim 9, wherein packets having higher speech rates are given higher queue priority over packets having lower speech rates during a given sampling period.

11 11. The apparatus according to claim 5, wherein each of the one or more decoding devices is further configured to decode all signals except for the signal that originated with the particular user associated with decoding device.

12. The apparatus according to claim 5, wherein the decoding device is included within at least one of a mobile telephone, an Internet phone and a PSTN.

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13. The apparatus according to claim 5, wherein the controller is configured to:  
create a call control table that tracks a number of participants in a current multi-party call in order to determine when existing participants drop out of the current multi-party call and when new participants join the multi-party call; and

relay information within the control table to the one or more decoding devices via the transport.

14. The apparatus according to claim 1, wherein the controller is configured to combine  
5 the tagged output signals by multiplexing the packets to form a single superpacket.

15. The apparatus according to claim 1, wherein the multi-party communication device is further configured to omit a respective user's voice signal from a signal sent by the controller via the transport network to that particular user.

16. The apparatus according to claim 1, wherein the tag includes one or more of a user  
ID, a type of encoding particular to the signal and a particular network of the originating user.

17. A method for multi-party conferencing in a communication network, the method comprising the steps of:

receiving a plurality of types of communication signals within a multi-party communication infrastructure from multiple parties via a transport network in communication with the infrastructure;

20 tagging received communication signal with a corresponding tag that includes predetermined information particular to each signal;

combining the tagged output signals into a single data packet; and

transmitting the single data packet to the multiple parties over the transport network to effect a multi-party communication session.

18. The method according to claim 18, wherein a first type of signals of the plurality of types of signals are packet based signals and a second type of signals of the plurality of signals are pulse code modulated signals; and the method further comprises the steps of:

decoding the received pulse code modulated signals;

5 summing the decoded pulse code modulated signals to achieve a single combined signal; and

encoding the single combined signal for packet based transmission and tagging the resulting encoded single combined signal with predetermined information particular to the encoded single combined signal.

10 19. The method according to claim 18, wherein the packet based signals are received from at least one of wireless mobile stations and voice over IP users and the pulse code modulated signals are received from PSTN landline users.

15 20. The method according to claim 17, further comprising the steps of:

receiving the tagged communication signals via the transport network within at least one of one or more decoding devices, wherein the tagged communication signals are de-tagged so as to extract the predetermined information within the tag; and

20 scheduling the communication signals for decoding by a particular decoder from a plurality of decoders respectively within each of the one or more decoding devices based on the tag information according to a predetermined queuing scheme.

21. The method according to claim 20, wherein each particular decoder is configured to handle a corresponding type of signal and also configured to decode multiple signals that are of the same type.
- 5 22. The method according to claim 21, wherein each of the plurality of decoders includes a plurality of predetermined thread logic routines that each correspond to a signal of the multiple signals that are of the same type.
23. The method according to claim 20, wherein each of the one or more decoding devices is assigned to a corresponding end user connected to the multi-party communication device.
24. The method according to claim 20, wherein the queue is scheduled to decode incoming signals based on a task scheduling algorithm wherein the signals to be decoded are ordered according to a speech rate of the packet.
25. The method according to claim 24, wherein packets having higher speech rates are given higher queue priority over packets having lower speech rates during a given sampling period.
- 20 26. The method according to claim 20, wherein the one or more decoding devices are further configured to decode all signals except for the signal that originated with the particular user associated with a corresponding decoding device.

27. The method according to claim 20, wherein the one or more decoding devices are included within at least one of a mobile telephone, an Internet phone and a PSTN.

28. The method according to claim 20, further comprising the steps of:

5       creating a call control table that tracks a number of participants in the multi-party call in order to track when users drop out of the multi-party call and when new users join the multi-party call; and

          relaying information from the control table to the one or more decoding devices via the transport network.

29. The method according to claim 18, wherein the packets are combined by multiplexing the packets to form a single super packet.

30. The method according to claim 18 further comprising the step of:

15       omitting a respective user's voice signal from a signal sent by the controller via the transport network to that particular user.

31. The method according to claim 18, wherein the tag includes one or more of a user ID, a type of encoding particular to the signal, and a particular network of the originating user.